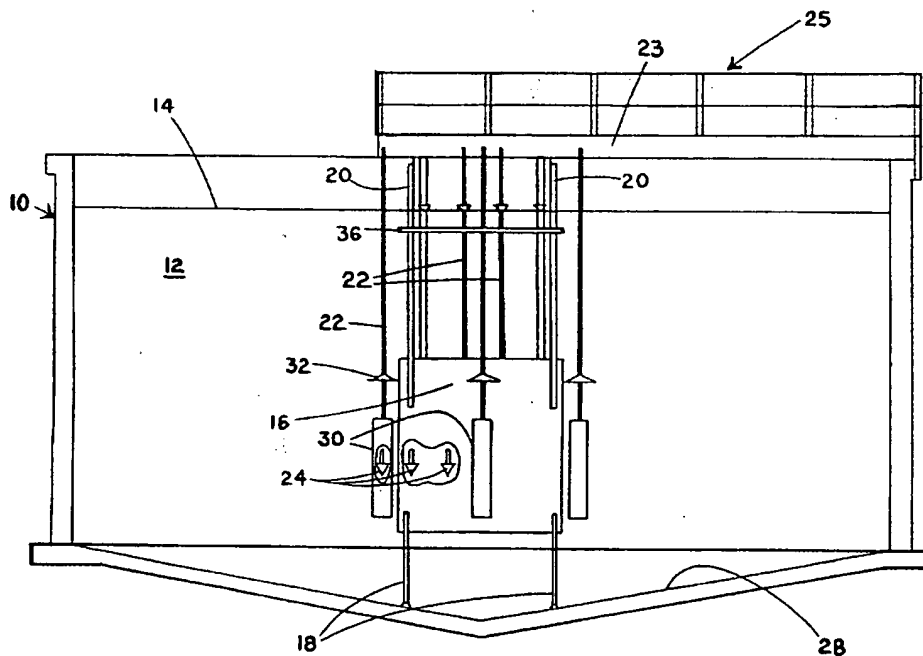


REMARKS

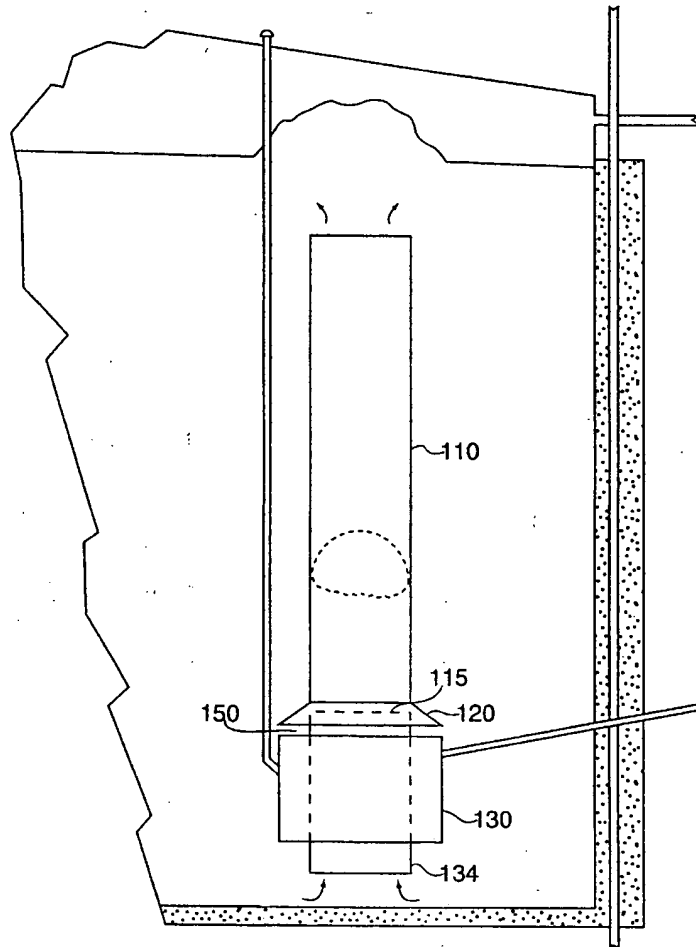
Upon entry of this amendment, claims 26-39 will be at issue. Four of the claims (claims 26, 35, 36, and 39) are independent. Because the applicant previously paid for five independent claims, no new fees are believed to be necessary.

The art

The cited Bailey '890 patent discloses a digester that has a central draft tube 16 that contains a plurality of drop pipes 23 each equipped with an air diffuser 24. As explained in column 4 of the patent, the diffusers are used to create an upward current through the draft tube. Peripheral draft tubes 30 are also provided with air diffusers. These diffusers are also used to provide an upward current through the draft tubes.



The DeVos patent discloses a submersible liquid circulator that also has a draft tube and a bubble generator. The draft tube has a gap between its upper and lower sections (110, 134) that provides an additional inlet point for liquid to enter the upward flow through the draft tube.



Distinctions in the claims

Several distinctions over the art have been incorporated into the claims.

Claim 26, for example, now recites that the lower draft tube is beneath the upper draft tube and that the vessel has means for pumping liquid through one of the draft tubes and “separate, independent” means for pumping liquid through the other draft tube. Neither the Bailey nor the DeVos patents disclose multiple pumps in axially aligned draft tubes. In the Bailey patent, the tubes are not axially aligned. In the DeVos patent, the tubes are aligned, but it appears that a single diffuser is used to provide the upward flow through the aligned tubes.

While the Clark ‘610 patent discloses the use of jet pumps to induce a flow of liquid through a draft tube, it does not disclose the idea of axially aligned draft tubes or suggest the

possible synergistic advantage of an arrangement having two different pumps in a single vertical pathway. In the applicant's design, for example, flows in the draft tubes can be directed into each other. The purpose of the gap in the DeVos patent appears to be to facilitate upward flow through the draft tube; the intent appears to be that flow will be in the same direction in both draft tube segments. Opposing this unidirectional flow would contravene the apparent intent of the patent. There has been no showing that it would have been obvious to one of ordinary skill in the art to provide a means for contravening that intent.

New claims 27-33 depend from claim 26 and are believed to be allowable based on the allowability of claim 27.

New independent claim 35 is similar to claim 27, but also recites that the two recited draft tubes have ends in a relatively wide middle section of the vessel. While the DeVos patent has a gap in the draft tube, the purpose of that gap appears to be only for allowing liquid to enter the draft tube to be carried upwards, and the suggestion appears to be that this gap should be located relatively near the bottom of the draft tube. In the applicant's invention, arranging ends of the draft tubes in the relatively wide middle section of the vessel can provide a special advantage: opposing flows in the two aligned tubes can spread horizontally into this relatively wide section to dissipate the velocity energy. The cited patents do not suggest any reason for moving the gap in the DeVos arrangement to a relatively wide middle section of a vessel.

The applicants have found a reason. In an egg-shaped digester and many tall digesters, the middle zone has the most volume and it can become important to get both bottom heavy material and top light material back into the most active middle zone. The applicant's dual zone system, where the opening can be used not only to take material into the draft tube but also as an outlet, is the only known system that can do it.

New independent claim 36 recites “means for pumping liquid downwards through the upper draft tube to the relatively wide middle section.” Again, neither of the primary references appears to disclose means for pumping liquid downwards. While the Clark ‘610 patent does disclose the use of jet pumps, it does not appear to disclose the idea of pumping liquid downwards to a relatively wide middle section of the vessel, and the cited art does not appear to suggest a reason for doing so.

Dependent claims 37 and 38 are believed to be allowable based on the same distinction.

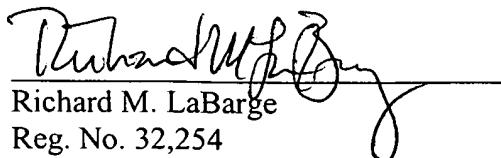
New independent claim 39 recites three axially-aligned draft tubes, and means for pumping liquid in opposite directions in the tubes. While the DeVos patent discloses what could be construed as axially-aligned draft tubes, it does not appear to suggest the use of three axially-aligned draft tubes. Further, since the purpose of the gap in the DeVos patent appears to be to facilitate upward flow through the draft tube, it would not have been obvious to one of ordinary skill in the art to provide a means for simultaneously opposing this flow.

These changes are believed to put the application in form for allowance, and thus the applicants request a notice of allowance of claims 26-39.

Respectfully submitted,

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